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What Works for Whom? Investigating Adolescents' Pro-Environmental Behaviors

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Abstract: Pro-environmental behavior has been extensively studied using general models of predicting behavior; however, these models have very limited value in making inferences about individuals. To address this shortcoming, a person-oriented investigation of five pro-environmental behaviors differing in complexity was carried out using a clustering approach. A total of 863 adolescents (mean age 15.72 (SD = 1.1), 53.5% female) filled in the Big Five Inventory and measures of recycling, water conservation, electricity conservation, sustainable consumption, and sustainable transportation use based on an extended model of the Theory of Planned Behavior (TPB). TPB models were investigated in empirically derived clusters of individuals that differ by their personality traits. The results suggest that individuals in different personality clusters could be reached effectively through different means when trying to promote pro-environmental behaviors and different pro-environmental behaviors should not be regarded as homogeneous.

Keywords: pro-environmental behavior; personality traits; person-oriented approach; theory of planned behavior; adolescence; school context

1. Introduction

Investigating what drives pro-environmental behaviors is extremely important in effectively addressing the pressing environmental challenges of our times [1]. Adolescents, being both those who will deal with environmental consequences and those who are actively pursuing positive change for the environment, are an interesting demographic to explore in terms of their pro-environmental behavior [2,3]. On the one hand, adolescents may lack both the knowledge and the resources needed to engage in certain pro-environmental actions and may be dependent on the adults that take care of them [4]; on the other hand, adolescents are quicker to engage in novel trends and are naturally curious, thus being a potentially powerful force for positive social change [5].

Research on pro-environmental behavior receives ever-increasing interest from researchers worldwide and has led to a vast body of research of predictive models of pro-environmental behavior. The research ranges from models designed specifically for investigating pro-environmental behaviors, such as the Value-Belief-Norm theory [6–10], the Value-Identity-Personal norm model [11,12] (to name a few), and the use of general models of explaining behavior such as the Theory of Planned Behavior (TPB) [6,13,14]. The knowledge gained through research thus far has focused on how the aforementioned models function in general and their general utility in explaining behavior. What is lacking, however, is a more person-oriented [15,16] understanding of how these models apply to different individuals.

There have been only a few very recent attempts at person-oriented research in understanding sustainable behavior. Namely, pro-environmental involvement was investigated in qualitatively derived value clusters of individuals and it was found that individuals with self-transcendence values were more involved in pro-environmental activities [17]. Additionally, a more evolutionarily-driven

person-oriented approach was adopted in investigating adolescents' recycling behavior [2], as well as the effectiveness of persuasive normative messages on changing adolescents' pro-environmental intentions [3] in clusters of individuals with different patterns of the Big Five personality traits. Although not person-oriented in a strict sense, a recent study investigated the effectiveness of various pro-environmental appeals on individuals with different value priorities [18], while another study adopted a within-person approach in investigating how environmental self-identity moderates the relationship between pro-environmental intention and behavior [19]. All of the aforementioned authors agree that there is a need for more research that can help understand pro-environmental behavior on the level of the individual. Thus, in the present study, we aim to address the apparent lack of person-oriented research by investigating pro-environmental behaviors using the Theory of Planned Behavior in clusters of individuals with different patterns of the Big Five personality traits.

1.1. The Theory of Planned Behavior

The TPB is one of the most widely used general models of predicting behavior [14,20–23]. The model proposes that behaviors can be directly predicted by the intention to perform said behaviors, while intention, in turn, can be predicted through attitudes toward that behavior, subjective norms regarding that behavior, and perceived behavioral control of performing that behavior [21]. Attitudes are formed through beliefs regarding a behavior, whether the behavior is viewed as positive or negative, pleasant or unpleasant, worthwhile or a waste of time, etc. [14,20]. Subjective norms represent one's beliefs about the prevalence and desirability of a behavior in one's close environment. Attitudes and subjective norms might also have direct, although small, effects toward behavior, but these paths are not usually included in studies using models based on the TPB. In evolutionary terms, subjective norms represent the perceived pressure from one's in-group—a group of others one favors, identifies with, and shares a common identity [24]. Perceived behavioral control represents one's perceived capability of performing a certain behavior and is in part subjective (hence the *perceived* part), but is partly objective as well, because it is formed largely through interaction with the environment and through observing the affordances present in the environment. Thus, perceived behavioral control is assumed to have a direct relationship with behavior as well [21].

Many studies find that the role of attitudes in predicting behavioral intention is quite inconsistent and there is a tendency for people to hold positive attitudes toward a behavior even if they do not engage in it [25,26]. To address the attitude-intention gap, we assess two types of attitudes in the present study: self- and society-oriented. From an evolutionary point of view, an individual can adopt various strategies toward achieving their goals [16,27], meaning that varied motivational forces can lead to the same outcome, for example—one might act pro-environmentally because they perceive a personal benefit in the action; alternatively, one could perceive a social benefit from performing a pro-environmental action. Selfless acts more often than not have some adaptive reason compelling the individual to act altruistically [28–31], meaning that even if one performs an action for the good of the society, the outcome is likely to be beneficial to the agent in indirect ways, such as through social recognition, praise, or an increase in social status [32,33]. Directly asking an individual if they would perceive social value in performing an action could confound one's answers [34–37], therefore, we opted to ask whether a behavior is perceived to be worthwhile in general, to get a more honest response. Differentiating attitudes into self- or society-oriented enables us to capture broader motivational forces behind behavioral intention [3].

1.2. The Place of Personality Traits in the Theory of Planned Behavior

The Big Five personality traits reflect robust aspects of individual difference that have been observed and validated extensively across cultures [38–41]. The Big Five traits are extraversion (enjoyment and proneness toward social interactions), neuroticism (proneness to feel negative emotions), openness (proneness to seek out novel things, experiences, and ideas), conscientiousness (ability for self-control),

and agreeableness (trusting others and being non-combative) [38]. The Big Five personality traits have a very strong genetic component and are found to be mostly stable throughout one's life [38,41].

The authors of the TPB acknowledge that individuals with different personality traits might differ in how they form their beliefs [21]. The authors of the theory state, for example, that "extroverts and introverts may also form different beliefs about performing other kinds of behaviors" [21], while more recent research shows that, at least for recycling behavior in an adolescent sample, the TPB functions slightly differently for different personality clusters [2]. Additionally, normative stimulation seems to affect the variables of the TPB differently in clusters of adolescents based on their Big Five traits [3], thus it becomes worthwhile to explore whether the predictive model of the TPB functions differently for different people. The authors of the theory propose that "< . . . > by placing introversion–extroversion or any other dispositional variable in the context of our model of behavioral prediction we gain a great deal of additional information about its role as a determinant of behavior. We learn not only whether the dispositional factor produces differences in behavior but also why the disposition predicts or fails to predict the behavior of interest" [21]. The addition of personality traits into the TPB does indeed allow for the investigation of linear relationships between single traits and the beliefs they are related to. However, this approach has a few limitations.

The first limitation of inserting personality traits directly into the TPB is practical: one cannot make inferences about the individual when only linear relationships among variables are observed [15,42,43]. For example, the linear relationship between extraversion and attitudes says nothing about the individual, because there are four more traits to be accounted for and it is quite likely that a neurotic extravert might form attitudes differently to an emotionally stable extravert [38,39]. Thus, inserting personality traits directly into the TPB, while interesting on the variable level, has very limited practical utility for understanding different people. Conversely, if we cluster individuals by their personality traits and investigate the patterns of traits as indivisible units [15,43], using them as moderators for the whole liner model of the TPB, we can gain insights into how the model functions for different individuals.

The second limitation of inserting personality traits directly into the TPB is conceptual. While the authors of the theory view this as a valid practice and propose ways of including various demographic and individual difference variables into the model [21], the TPB is a behavior-specific model and any non-specific variable arguably undermines the idea of the theory. While there are studies that directly relate personality traits with pro-environmental behaviors [44–50], personality traits usually are very weak predictors of specific behaviors [20,21], which is to be expected, given that personality traits represent our innate dispositions and tendencies, not our beliefs [38,51]. Thus, directly including personality traits into a behavior-specific model, which operationalizes the individual's beliefs regarding a specific behavior, seems contrary to the idea of the TPB. While individual differences are indeed valuable in predicting behavior [21], it is more theoretically sound to take them as moderators for the whole model, rather than including them directly. Such an approach would allow investigating the differences between different groups of individuals and would allow for inferences on the individual level.

1.3. Personality Traits and Pro-Environmental Behavior

Linear relationships between personality traits and various pro-environmental behaviors have been investigated quite extensively and, while there are some inconsistencies among studies, the trait of openness is most often found to be positively related to pro-environmental behavior [45–47,50]. Traits of agreeableness, extraversion, and conscientiousness are also often found to be positively related to pro-environmental behavior or environmental concern [47–49]. The aforementioned linear relationships, while informative on how single traits relate to pro-environmental behavior, do not allow for inferences about the individual, thus it remains unclear what type of *person* is more likely to engage in pro-environmental behavior and how different people form beliefs regarding pro-environmental behaviors altogether.

Human personality traits vary substantially between individuals, suggesting that all levels of trait expression have an adaptive function [38,39]. However, no one trait is responsible for any given behavior [38], and no one gene is responsible for any one personality trait [52], thus it becomes unreasonable to assume that personality traits are modular adaptations [16]. While we can assess different aspects of an individual's personality (e.g., the Big Five traits), we cannot assume these aspects to be separate adaptations and independent. For example, an introverted and open individual would react to external environments differently than an extraverted and open individual, thus the way a given trait is expressed through behavior depends on both the trait and other traits that interact with it, meaning that an individual is a complex interacting system where the whole system is responsible for behavioral outcomes, rather than different components of the system [15,43,53,54]. Therefore, it is more reasonable to hold that one's behavior is a function of the *pattern of traits* comprising the whole of one's personality and that this pattern results in pattern-typical ways of attaining proximal and ultimate goals [16].

Based on previous research [2], we can infer that personality profiles with high openness and conscientiousness would be associated with pro-environmental behaviors, while closed and neurotic individuals might opt for self-enhancing and socially acceptable behaviors and thus would be more motivated by society- and self-oriented attitudes. However, given the relatively unexplored nature of the relationship between personality trait patterns and pro-environmental attitudes and behaviors, and because this study is exploratory in nature, no hypotheses for these relationships are proposed.

1.4. Why Analyze Specific Behaviors?

While it is easy to conceptually group certain behaviors into a broad category of "environmental behavior", a lot of actions are performed out of habit [55,56] or influenced by the immediate situation a person is in [20,21]. Different pro-environmental behaviors have differing infrastructure [56–58], incentives, or disincentives associated with them [59], they also might have different attitudinal beliefs associated with them [21]. Many actions that lead to pro-environmental outcomes might not be perceived as such and various behaviors have differing environmental impact, resulting in them being only weakly or not at all correlated [60]. In the present study we do not assume our investigated behaviors to be identically performed by the participants of the study. By analyzing separate behaviors, we get a more precise image of how different individuals approach different behaviors and achieve a more holistic picture of the peculiarities of how behavioral strategies relate to different behaviors.

1.5. The Present Study

The present study adopts a person-oriented approach [43,53] and regards personality as a whole. In the present study, we investigate five pro-environmental behaviors: recycling, water conservation, electricity conservation, sustainable consumption, and sustainable transportation use. Previous person-oriented research found that individuals with socially desirable traits (high extraversion, openness, agreeableness, conscientiousness, and low neuroticism) recycle more and hold more positive attitudes toward recycling, while individuals in clusters with less socially desirable traits are not as engaged in recycling [2]. However, previous similar research either focused only on one behavior [2], or did not include predictive models and investigated only changes in TPB variables after a normative intervention [3]. The objective of the present study is to partially replicate previous findings [2] and to expand upon them by exploring the moderating effect of personality profiles on behaviors. Following the example we are replicating, we will first investigate mean-level differences of the TPB among personality clusters, followed by an investigation of the moderating effect of personality on the model level, and finally—on the path level. We are hoping this approach will provide insight on how individuals from each personality cluster can be targeted in promoting pro-environmental behavior.

2. Materials and Methods

2.1. Data Collection and Sample Characteristics

Students from five high schools in Klaipėda (Lithuania) participated in the study. Consent was obtained from the schools' management. The parents of the participating adolescents were informed about the upcoming study and were given an opportunity to opt out of it at any moment by informing the researchers. Participants were given the opportunity to opt out of the study at any point by not filling in the questionnaire. Based on previous work [2], a preliminary target of 800 observations was set in order to have approximately 200 observations per cluster (assuming a 4-cluster solution).

A total of 863 adolescents participated in the study. The participant ages ranged from 14 to 18 years, with a mean age of 15.72 (SD = 1.1); 401 were male (46.5%) and 462 were female (53.5%). Participants filled in the questionnaire online in the classroom, during a time arranged by their schools' staff. School staff members supervised the procedure.

2.2. Measures

2.2.1. Personality Traits

The Big Five Inventory (BFI) consisting of 44 items was used to assess the five personality traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience [51]. Items were scored on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

The Lithuanian translation of the BFI has been previously used with adolescents in Lithuania [2] and is sufficiently clear for this age group to understand the questionnaire items [61].

The measures of extraversion ($\alpha = 0.71$ [0.67, 0.73]; $\omega = 0.61$), agreeableness ($\alpha = 0.63$ [0.59, 0.67], $\omega = 0.53$), conscientiousness ($\alpha = 0.73$ [0.71, 0.76], $\omega = 0.54$), neuroticism ($\alpha = 0.75$ [0.72, 0.77], $\omega = 0.46$), and openness to experience ($\alpha = 0.82$ [0.81, 0.84], $\omega = 0.84$) showed sufficient internal consistency.

2.2.2. Theory of Planned Behavior

All TPB measures used in the present study were taken from previously published research [3]. Five behaviors were investigated: recycling, water conservation, electricity conservation, sustainable consumption, and sustainable transportation use. English translations of all the items used to assess the components of the TPB are presented in Appendix A (original Lithuanian items are available upon request).

Attitudes. Two types of attitudes were assessed: self- and society-oriented. For each behavior, each type of attitude was assessed with two items, e.g., the self-oriented attitudes towards recycling were assessed with the items "it would be fun for me if I were to recycle in the upcoming two months" and "it would be interesting for me if I were to recycle in the upcoming two months", while the society-oriented attitudes towards recycling were assessed with the items "it would be meaningful if I were to recycle in the upcoming two months" and "it would be beneficial if I were to recycle in the upcoming two months". Items towards other behaviors were worded in a similar fashion. Each item was rated on a Likert scale from 1 (completely disagree) to 5 (completely agree). Item ratings of each type of attitude were averaged to compute the self- and society-oriented attitude scores. The attitude measures showed good internal consistency and divergent validity between self- and society-oriented attitudes [3].

Subjective norms. Subjective norms were assessed with two items for each behavior. One item was directed at the subjective norm (e.g., "people who are important to me, whom I like and respect, would approve of me recycling in the upcoming two months"), and one was directed at the motivation to comply with the norm (e.g., "it is important to me what people who are important to me, whom I like and respect, think about me recycling in the upcoming two months"). Each item was rated on a Likert scale from 1 (completely disagree) to 5 (completely agree). The two items for each behavior were multiplied to compute the subjective norm score.

Perceived behavioral control. Perceived behavioral control was assessed with two items for each behavior. One item was directed at the perceived capability to perform a behavior (e.g., "it would be easy for me to recycle in the upcoming two months"), and the other—at the perceived controllability of the behavior (e.g., "it is completely up to me whether I will recycle in the upcoming two months"). Each item was rated on a Likert scale from 1 (completely disagree) to 5 (completely agree). The two items for each behavior were multiplied to compute the perceived behavioral control score.

Intention and behavior. Intention to perform a behavior, as well as past behavior, were assessed with one item for each behavior. For example, the intention to recycle was assessed with the item "in the upcoming two months I intend to recycle, I want to do it and I truly know that I will", while past recycling behavior was assessed with the item "in the past two months I always recycled". Each item was rated on a Likert scale from 1 (completely disagree) to 5 (completely agree).

2.3. Ethical Considerations and Managing Order Effects

The results presented and discussed in this paper were computed from the first-wave dataset of a larger interventional study [3]. The present study does not duplicate any results from the aforementioned study; however, it uses the same clusters of participants. The data used in the present study are openly available on the OSF platform (https://osf.io/zwh47).

The participants had to complete additional measures that are not discussed in this article. Effort was made to minimize the possible question order and form effects [34]. The participants were presented with demographic questions first (age and sex). After that, the participants completed the personality questionnaire (items presented in random order for each participant) and the TPB measures (items presented in random order for each participant). Participants did not complete other measures that might prime them with pro-environmental attitudes or values prior to completing the aforementioned measures. All items on all measures discussed in the present study were rated on a five-point Likert scale.

2.4. Analysis Strategy

The online questionnaire used in the present study required all questions to be answered, therefore there are no missing data. Empirical clustering (hierarchical, Ward's method) was used to group participants into personality trait clusters. Personality trait scores were transformed into Z-scores for ease of interpretation. All variables used for linear modelling were within acceptable ranges of skewness and kurtosis, allowing us to use the maximum-likelihood estimation for structural equations. For reporting model fit we adopt a multiple indices strategy by reporting chi-square, CFI, TLI, and RMSEA. For CFI and TLI, values of 0.95 and higher indicate good fit; for RMSEA, values of 0.07 and lower indicate good fit; for all fitness indices some deviation from the threshold is considered acceptable [62].

3. Results

Descriptive statistics for all variables used in the present study are presented in Appendix B. Participants were empirically clustered according to their Big Five traits through hierarchical clustering, using Ward's method. Even though there is some debate on the optimal method of grouping observations [15], empirical clustering is often preferred in person-oriented research because it generates clusters that are more realistic and "down to earth" [42,43,53]. Previous research on similar samples had yielded a three-cluster solution [63]; one's strategies of achieving proximal and ultimate goals are dependent on the specific environment one is in [27], and a variety of clustering solutions tend to be explored before deciding on the final number of clusters [64]. The cluster analysis in the present study resulted in four meaningful clusters (Table 1) that are very similar, but not completely identical to those obtained in previous research with Lithuanian adolescents using the same measure [2].

Table 1. Z-scores of the Big Five measures in the four clusters.

	Negative (N = 267)	**Conservative (N = 198)**	**Outgoing (N = 202)**	**Positive (N = 196)**
Extraversion	−0.67	−0.48	0.79	0.58
Agreeableness	−0.35	−0.33	−0.10	0.93
Conscientiousness	−0.36	−0.67	0.09	1.07
Neuroticism	0.59	−0.02	−0.15	−0.63
Openness	0.21	−1.06	0.10	0.68

Even when replicating an established cluster solution, one can expect a fair amount of variation [63,64], but there is a tendency for cluster accuracy of describing an individual to increase with the number of clusters [43]. In the present study the four-cluster solution produced conceptually different and useful clusters that will be described below. The cluster names were chosen for a concise representation of the main features of the clusters. The *Negative* cluster groups individuals with socially undesirable traits. These individuals tend to avoid social interaction, are very cautious, and are moderately disagreeable and unconscientious. However, they do not shy away from novel ideas. This cluster shares some similarities with the *overcontrolled* cluster described by Meeus et al. [63].

The *Conservative* cluster was so named because it groups individuals with low openness. The individuals in this cluster avoid novel ideas, social interaction, and are unconscientious. However, they are relatively emotionally stable. These characteristics are shared by the *undercontrolled* cluster described by Meeus et al. [63]. It seems that the individuals in this cluster are likely to approach life from a tried-and-true perspective, conservatively avoiding unfamiliar ideas and practices [38].

The *Outgoing* cluster groups individuals with high extraversion, which is the main characteristic of this cluster. The individuals in this cluster are fairly average regarding all other personality traits, thus indicating that people in this cluster can be best described as seeking social interaction and being outgoing [39]. This cluster can be reasonably thought to be a more socially desirable subset of the *undercontrolled* cluster described in previous research [63,64].

The *Positive* cluster groups individuals with socially desirable traits and closely resembles the *resilient* cluster identified by Meeus et al. [63]. While personality traits can be considered adaptive at all levels of expression [38], this cluster groups individuals that can be considered positive for the society in general. Individuals in this cluster are emotionally stable, social, friendly, responsible, and open to new ideas and experiences.

A graphical comparison of the Z-scores of all TPB measures in all four clusters is presented in Figure 1. Clusters differ significantly on all TPB measures for each behavior; the sole exception being self-reported use of sustainable transportation (see ANOVA in Appendix C). The effect sizes for the ANOVA ranged from small to medium [65], while the effect sizes (d) of pairwise comparisons are equal to pairwise differences in Z-scores. The comparison revealed a pattern of differences among clusters: the *Positive* cluster has the highest scores on all measures, while the *Conservative* cluster has the lowest scores. The *Outgoing* cluster presented itself as being average, while the *Negative* cluster has slightly more positive society-oriented attitudes with everything else being roughly average as well, indicating that at least on the mean level these two clusters are more similar than different [66]. Consistently with what the authors of the TPB claim [21], this suggests individual differences play a substantial role in how the predictive components of the TPB are expressed in a person.

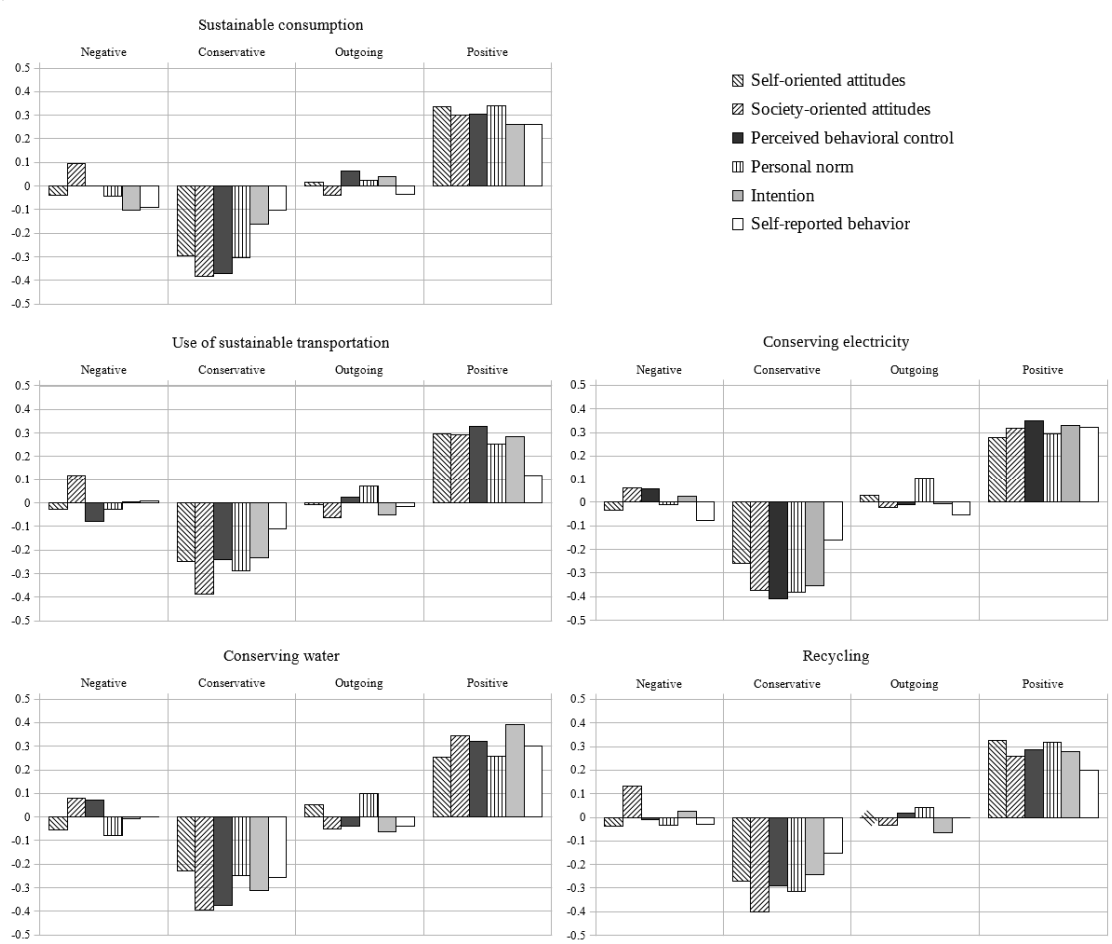

Figure 1. Comparison of Z-scores of Theory of Planned Behavior (TPB) measures in all clusters.

Path-analytical structural equation models based on an extended model of the TPB were run in a multi-group analysis of the behavior-specific variables using clusters as grouping variables (Table 2). The analysis used the bootstrapped maximum likelihood estimator. All models demonstrated sufficient fit. Group differences for each model were assessed by fully constraining the models and comparing them based on the χ^2 statistic. If significant differences were found on the model level, each regression path was investigated separately using a similar approach based on the χ^2 statistic.

Table 2. Path analysis results for all tested models in the four clusters.

	Negative		Conservative		Outgoing		Positive		Path Difference
	R^2	β [CI]	R^2	β [CI]	R^2	β [CI]	R^2	β [CI]	$\Delta\chi^2$
Sustainable consumption									
Intention	0.42 *		0.29 †		0.47 *		0.30 †		
Self-oriented attitudes		0.20 * [0.09, 0.31]		0.22 * [0.05, 0.38]		0.30 ** [0.17, 0.42]		0.14 [−0.03, 0.28]	68.675
Society-oriented attitudes		0.02 [−0.09, 0.10		0.18 † [0.02, 0.37]		0 [−0.16, 0.11]		0 [−0.14, 0.19]	69.473
Subjective norm		0.23 ** [0.12, 0.37]		0.16 [0, 0.34]		0.21 ** [0.11, 0.36]		0.14 [−0.05, 0.31]	68.052
Perceived behavioral control		0.36 ** [0.27, 0.46]		0.11 [−0.02, 0.26]		0.31 ** [0.21, 0.44]		0.36 * [0.18, 0.50]	72.929 †
Self-reported behavior	0.35 **		0.21 *		0.28 *		0.35 *		
Perceived behavioral control		0.18 ** [0.07, 0.32]		0.11 [−0.02, 0.26]		0.23 * [0.09, 0.36]		0.30 ** [0.19, 0.43]	69.762
Intention		0.47 ** [0.33, 0.59]		0.40 * [0.26, 0.54]		0.36 ** [0.25, 0.49]		0.39 ** [0.22, 0.53]	68.496
Conserving electricity									
Intention	0.43 *		0.38 *		0.42 *		0.42 *		
Self-oriented attitudes		0.31 * [0.20, 0.41]		0.28 * [0.13, 0.42]		0.33 ** [0.19, 0.47]		0.01 [−0.09, 0.14]	58.195 **
Society-oriented attitudes		−0.03 [−0.13, 0.13]		0.26 * [0.09, 0.42]		0.13 [−0.04, 0.27]		0.28 * [0.13, 0.44]	53.256 **
Subjective norm		0.20 * [0.07, 0.30]		−0.04 [−0.21, 0.10]		0.22 * [0.06, 0.36]		0.20 * [0.05, 0.34]	47.390 †
Perceived behavioral control		0.32 * [0.18, 0.45]		0.28 ** [0.16, 0.42]		0.13 [−0.01, 0.24]		0.29 * [0.10, 0.40]	46.103
Self-reported behavior	0.27 *		0.14 *		0.27 *		0.26 *		
Perceived behavioral control		0.34 * [0.20, 0.45]		0.19 * [0.06, 0.31]		0.20 ** [0.11, 0.36]		0.27 * [0.12, 0.41]	44.651
Intention		0.25 ** [0.15, 0.40]		0.24 * [0.08, 0.36]		0.40 * [0.28, 0.52]		0.31 * [0.14, 0.49]	44.570
Recycling									
Intention	0.35 *		0.32 †		0.55 †		0.44 *		
Self-oriented attitudes		0.17 ** [0.07, 0.30]		0.22 ** [0.09, 0.37]		0.32 * [0.17, 0.47]		0.17 * [0.05, 0.31]	31.706
Society-oriented attitudes		0.07 [−0.03, 0.20]		−0.06 [−0.20, 0.09]		0.05 [−0.07, 0.18]		−0.02 [−0.13, 0.10]	31.866
Subjective norm		0.17 * [0.06, 0.29]		0.31 * [0.18, 0.44]		0.01 [−0.12, 0.14]		0.35 ** [0.24, 0.50]	44.775 **
Perceived behavioral control		0.33 * [0.18, 0.43]		0.23 * [0.06, 0.40]		0.46 * [0.33, 0.59]		0.28 * [0.14, 0.38]	35.215
Self-reported behavior	0.37 *		0.33 *		0.46 *		0.46 *		
Perceived behavioral control		0.30 * [0.19, 0.41]		0.25 ** [0.15, 0.41]		0.28 ** [0.16, 0.43]		0.26 ** [0.15, 0.38]	29.838
Intention		0.39 * [0.27, 0.51]		0.43 * [0.27, 0.54]		0.46 * [0.32, 0.56]		0.50 * [0.35, 0.59]	31.627
Use of sustainable transportation									
Intention	0.44 *		0.35 *		0.33 *		0.40		
Self-oriented attitudes		0.27 ** [0.15, 0.40]		0.02 [−0.15, 0.20]		0.28 ** [0.16, 0.40]		0.43 * [0.31, 0.55]	62.428 **
Society-oriented attitudes		0.06 [−0.08, 0.14]		0.11 [−0.04, 0.28]		−0.03 [−0.16, 0.11]		0.04 [−0.08, 0.17]	48.173
Subjective norm		0.13 † [0.01, 0.23]		0.13 [−0.05, 0.24]		0.15 † [0.01, 0.30]		0.13 [−0.01, 0.26]	46.625
Perceived behavioral control		0.38 ** [0.27, 0.48]		0.43 * [0.29, 0.57]		0.29 * [0.14, 0.42]		0.14 [−0.01, 0.27]	58.551 **

Table 2. *Cont.*

	Negative		Conservative		Outgoing		Positive		Path Difference
	R^2	*β [CI]*	R^2	*β [CI]*	R^2	*β [CI]*	R^2	*β [CI]*	$\Delta\chi^2$
Use of sustainable transportation									
Self-reported behavior	0.33 *		0.23 †		0.32 *		0.29 *		
Perceived behavioral control		0.22 * [0.11, 0.33]		0.27 * [0.11, 0.40]		0.22 * [0.08, 0.35]		0.30 ** [0.17, 0.44]	48.107
Intention		0.42 ** [0.31, 0.55]		0.28 * [0.10, 0.43]		0.42 ** [0.32, 0.54]		0.33 * [0.19, 0.44]	49.473
Conserving water									
Intention	0.42 *		0.25 *		0.46 *		0.49 *		
Self-oriented attitudes		0.15 * [0.05, 0.31]		0.23 * [0.07, 0.41]		0.32 * [0.16, 0.43]		0.32 * [0.17, 0.42]	n/a
Society-oriented attitudes		0.22 ** [0.11, 0.33]		0.16 [−0.02, 0.30]		0.16 † [0.03, 0.27]		0.20 ** [0.09, 0.36]	n/a
Subjective norm		0.17 * [0.04, 0.27]		0.09 [−0.06, 0.25]		0.03 [−0.10. 0.21]		0.06 [−0.03, 0.16]	n/a
Perceived behavioral control		0.29 * [.17, 0.41]		0.16 [0, 0.30]		0.31 ** [0.18, 0.43]		0.30 ** [0.19, 0.43]	n/a
Self-reported behavior	0.30 **		0.28 *		0.35 *		0.37 *		
Perceived behavioral control		0.12 * [0.01, 0.23]		0.21 [0.06, 0.37]		0.34 * [0.20, 0.49]		0.34 * [0.22, 0.45]	n/a
Intention		0.47 ** [0.35, 0.61]		0.40 ** [0.28, 0.55]		0.33 ** [0.19, 0.51]		0.34 * [0.23, 0.46]	n/a

Notes. † $p < 0.1$, * $p < 0.05$; ** $p < 0.01$. The 90% bias-corrected percentile confidence intervals are presented in brackets. Path difference indicates $\Delta\chi^2$ after constraining that path (Δdf = 3). **Sustainable consumption:** Unconstrained fit: $\chi^2(12) = 66.017$, $p < 0.01$; CFI = 0.97, TLI = 0.85, RMSEA = 0.07 [0.06, 0.09], $p_{close} = 0.014$. Fully constrained fit: $\chi^2(48) = 128.887$, $p < 0.01$; CFI = 0.95, TLI = 0.94, RMSEA = 0.04 [0.04, 0.05], $p_{close} = 0.838$. Difference: $\Delta\chi^2(36) = 62.87$, $p < 0.01$. **Conserving electricity:** Unconstrained fit: $\chi^2(12) = 40.59$, $p < 0.01$; CFI = 0.98, TLI = 0.92, RMSEA = 0.05 [0.04, 0.07], $p_{close} = 0.37$. Fully constrained fit: $\chi^2(48) = 107.454$, $p < 0.01$; CFI = 0.97, TLI = 0.96, RMSEA = 0.04 [0.03, 0.05], $p_{close} = 0.98$. Difference: $\Delta\chi^2(36) = 66.864$, $p < 0.01$. **Recycling:** Unconstrained fit: $\chi^2(12) = 29.239$, $p < 0.01$; CFI = 0.99, TLI = 0.95, RMSEA = 0.04 [0.02, 0.06], $p_{close} = 0.765$. Fully constrained fit: $\chi^2(48) = 108.829$, $p < 0.01$; CFI = 0.97, TLI = 0.96, RMSEA = 0.04 [0.03, 0.05], $p_{close} = 0.977$. Difference: $\Delta\chi^2(36) = 79.59$, $p < 0.01$. **Use of sustainable transportation:** Unconstrained fit: $\chi^2(12) = 46.506$, $p < 0.01$; CFI = 0.98, TLI = 0.90, RMSEA = 0.06 [0.04, 0.08], $p_{close} = 0.21$. Fully constrained fit: $\chi^2(48) = 110.337$, $p < 0.01$; CFI = 0.96, TLI = 0.95, RMSEA = 0.04 [0.03, 0.05], $p_{close} = 0.97$. Difference: $\Delta\chi^2(36) = 63.831$, $p < 0.01$. **Conserving water:** Unconstrained fit: $\chi^2(12) = 31.204$, $p < 0.01$; CFI = 0.99, TLI = 0.95, RMSEA = 0.04 [0.03, 0.06], $p_{close} = 0.701$. Fully constrained fit: $\chi^2(48) = 66.747$, $p < 0.05$; CFI = 0.99, TLI = 0.99, RMSEA = 0.02 [0.01, 0.03], $p_{close} = 1$. Difference: $\Delta\chi^2(36) = 34.543$, $p = 0.49$.

4. Discussion

The discussion follows the order of the goals we set out. We will first discuss the mean-level differences of the TPB variables among personality clusters, followed by an investigation of model-level and path-level differences, and will continue with short discussions of the peculiarities of each cluster. Finally, we will discuss the limitations of the present study and will discuss possible future directions.

The first notable finding in the present study is that people with different patterns of personality traits tend to hold different attitudes, subjective norms, and have different perceived behavioral control regarding the investigated behaviors. While previous research found that the *Negative* cluster might be the least environmentally friendly [2], the present study adds to the understanding of this cluster. The *Negative* cluster in the present study is mostly average on all TPB measures and is similar to the *Outgoing* cluster, with slightly more expressed positive society-oriented attitudes toward pro-environmental behaviors. It must be noted that this cluster, while being characterized by mostly undesirable traits, is not averse to new experiences and ideas, which likely is what makes them relatively open to pro-environmental behaviors. The *Conservative* cluster presents itself as the least pro-environmental, with medium to large differences in Z-scores (effect size) on many measures when compared to the *Negative* or the *Outgoing* clusters, and very large differences when compared to the *Positive* cluster.

In the sample of the present study, model-level differences were observed for four of five investigated behaviors: sustainable consumption, conserving electricity, recycling, and the use of sustainable transportation. These model-level differences indicate that for individuals with different patterns of personality traits, TPB models function significantly differently and it may be that different strategies of attaining proximal and ultimate goals might have an effect on how individuals approach pro-environmental behaviors [16]. A further look at path-level differences revealed that models for conserving electricity and for the use of sustainable transportation had the most pronounced differences among the clusters. For sustainable transportation use, the *Positive* cluster had the most pronounced effect of self-oriented attitudes on intention, while no other variable contributed significantly toward intention. Conversely, for the *Negative* cluster, only perceived behavioral control contributed significantly toward intention, while in other clusters both self-oriented attitude and perceived behavioral control were significant contributors in predicting intention. For conserving electricity, self-oriented attitudes did not contribute significantly in predicting intention only for the *Positive* cluster, while society-oriented attitudes were a significant predictor only for the *Positive* and *Conservative* clusters.

The investigated behaviors in general have little difference on the path level and the lack of consistent differences in paths suggests that the TPB models function quite similarly for all personality clusters, which is consistent with previous research [2]. However, the small differences that were observed indicate that different pro-environmental behaviors are perceived differently and, therefore, should not be investigated as an aggregated measure. The following paragraphs will discuss the peculiarities and consistencies that are observed on the cluster level and how each cluster could be best approached in promoting pro-environmental behavior.

For the *Negative* cluster, there seems to be a consistent effect of self-oriented attitudes, subjective norms, and perceived behavioral control. This suggests that the *Negative* cluster engages in pro-environmental actions if their engagement does not require additional labor (high perceived control), or is beneficial (positive self-oriented attitudes), and is perceived to be adaptive through social cues (subjective norm). Thus, for this cluster to engage in pro-environmental actions, a clear reward or reinforcement mechanism needs to be in effect; pro-environmental actions need to require less effort and need to be pleasant, the available infrastructure needs to reinforce pro-environmental actions by making them readily available and through behavioral defaults.

When compared to the *Negative* cluster, the individuals in the *Conservative* cluster are more emotionally stable, but much less open to experience and even less conscientious, with other traits being roughly the same among these clusters. In the present study, this pattern of traits was found to

be the least environmentally friendly and this effect is consistent among all investigated behaviors. Unconscientious people tend to seek immediate gratification and tend to overlook the long-term consequences of their actions, resulting in behavior that is not environmentally friendly. Furthermore, low openness suggests that the individuals in the *Conservative* cluster are averse to novel ideas and seldom engage in novel or unconventional activities [38], while many of pro-environmental activities require changing habits and adopting new practices. Taken individually, both low openness and low conscientiousness lead to socially undesirable outcomes [38], while taken together their undesirable effect is even more apparent.

The effect of society-oriented attitudes is somewhat consistent for many pro-environmental behaviors in the *Conservative* cluster. This suggests that individuals with lower openness and conscientiousness might be more inclined to engage in activities if they perceive their actions to be socially beneficial and perhaps leading to desirable social outcomes. This might indicate a preference for engaging in those activities, which are safe and tried-and-true [38]. Speaking in evolutionary terms, this provides support to the claim that individuals in the *Conservative* cluster prefer low-risk behaviors with consistent rewards—they decide to act pro-environmentally if they perceive that society would approve of their actions and perhaps even reward them. Self-oriented attitudes are also a consistent predictor of pro-environmental intention in this cluster, thus the individuals in this cluster might be more hedonistically driven and they tend to consider their own interest when deciding to act pro-environmentally. Coupled with the fact that the *Conservative* cluster almost consistently shows subjective (in-group) norms as insignificant predictors of their pro-environmental intentions, external reinforcement and shaping behavioral defaults seems the most plausible way of encouraging these individuals to act pro-environmentally. The *Conservative* cluster might also be more responsive to authoritative appeals, rather than following a norm in which they do not firmly believe in or of which they do not see any (immediate) benefit.

The individuals in the *Outgoing* cluster are similar to those in the *Negative* cluster in their relative engagement and attitudes toward pro-environmental behaviors. While grouping individuals with mostly average traits, the *Outgoing* cluster is characterized by its high extraversion, which leads to this cluster being very socially driven [38,39]. Thus, this cluster might be effectively reached through normative influence [3], and with socially activated and reinforced behavior. However, when looking at the path-analytical models of the TPB, the only truly consistent predictor among all pro-environmental behaviors for this cluster is self-oriented attitudes and to a lesser degree—perceived behavioral control. This suggests that the individuals in the *Outgoing* cluster might be hedonistically motivated and thus can be effectively encouraged to act pro-environmentally through positive reinforcement of their behaviors and through making them more readily available. In this regard, strategies for reaching the *Outgoing* cluster might be similar to those of reaching the *Conservative* cluster.

The individuals in the *Positive* cluster consistently have higher scores on all measured variables, firmly establishing this cluster as the most environmentally friendly [2]. It seems that individuals in this cluster are not only positive regarding their personality profiles, but regarding their pro-environmental intentions and self-reported behaviors as well. However, the *Positive* cluster shows the least consistent effect of various predictors among behaviors. Thus, even though it is hard to pinpoint how this cluster could be targeted, it is clear that other clusters should be prioritized in social policies that aim to encourage pro-environmental behavior.

4.1. Conclusions

- People with different patterns of personality traits tend to hold different attitudes, subjective norms, and have different perceived behavioral control regarding recycling, water conservation, electricity conservation, sustainable consumption, and sustainable transportation use. The approach toward all investigated behaviors is fairly consistent within a given personality type.

- Model-level differences were observed for four of five investigated behaviors, suggesting that individuals with different patterns of personality traits approach pro-environmental behaviors differently.
- A deeper focus on individual characteristics and their evolutionary function can enable the development of more precise interventions for positive social change.

4.2. Limitations of the Present Study

Assessing actual behavior in the present study was impossible for practical reasons, therefore only self-reported past behavior was assessed as a proxy for future behavior [8] rather than an additional predictor of intention [14]. Assessing both intention and behavior at the same timepoint is a common approach [8,67,68], but it limits the interpretation of the path leading from intention to behavior in the TPB [14]. It must be noted that past behavior was assessed subjectively. While it is best to assess behavior through frequency, it would have required additional measures of opportunities for behavior in the past two months, which would have been difficult to remember, and the remembered opportunities would have been biased.

It must be noted that while the present study investigates TPB models in clusters based on personality traits, the participants were recruited from different schools and therefore do not share equal environmental conditions; additionally, the groups of participants from different schools were unequal and thus some non-random variance could potentially be affecting the data.

In similar vein, the present study used an empirical clustering procedure, rather than likelihood clustering and there were no strong assumptions on the specifics of the clusters. Despite that, the present study mostly replicated the cluster structure previously found in a similar sample in Lithuania [2], lending some support to the robustness of the derived clusters. Nevertheless, it must be stressed that the nature of the sample did not guarantee that the participants would have personality traits that are comparable in their distribution to the national population. The clustering procedure used in the present study maximizes the differences among clusters in the present sample and therefore the clusters can be said to fully represent only the present sample and not the national population [3].

4.3. Implications and Future Directions

Current research trends on pro-environmental behavior move firmly into investigating specific behaviors, and for good reason [19]. As evidenced by the results of the present study, even though there are some consistent effects in clusters, it is hard to pinpoint a truly universal pattern of the moderating influence of personality types on the TPB models for all five behaviors that were investigated in the present study. Personality trait patterns do have an effect on the TPB for various behaviors, but the specifics of each behavior need to be addressed separately. This brings forth two important issues in pro-environmental research.

The first issue is that there are still researchers that resort to investigating pro-environmental behaviors with general measures that encompass a mixture of various pro-environmental actions [69–71]. This is problematic because different pro-environmental behaviors have different availability for different individuals [60]. There might be reinforcing infrastructure present for some pro-environmental actions, while others might be made difficult [56–58]; some pro-environmental actions might be intuitive, while others—counterintuitive [60]. Therefore, to investigate pro-environmental behavior as a homogeneous construct would be inaccurate.

The second issue is that even when investigating separate pro-environmental behaviors, there still is a lack of focus on the individual. Even behavior-specific models of pro-environmental behavior are tested in general samples, ignoring individual differences, or addressing them only through correlations. The results of the present study highlight that assuming a predictive model functions the same way for every individual is inaccurate and could potentially lead to inefficient social policy.

There needs to be a shift of focus towards *individuals* in the pursuit of effective social change and effective social policy [72]. It is abundantly clear that people differ on many levels and a one-fits-all

approach will not be effective in tackling such social issues as environmental conservation [2]. Therefore, a more focused approach, which is tailored to be effective for specific groups of individuals, seems like the most prudent course of action.

Lastly, there is potential for future research to look at longitudinal functioning of the TPB in predicting pro-environmental behaviors, focusing on the change dynamics of the TPB variables in an intervention context. This type of research would allow to understand the mechanism through which positive change occurs for different individuals.

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Appendix A

Table A1. English translation of the items used to assess components of the TPB.

Variable	Item
	Sustainable consumption
ATT-S	It would be meaningful if I were to choose environmentally friendly goods in the upcoming two months.
ATT-S	It would be beneficial if I were to choose environmentally friendly goods in the upcoming two months.
ATT-P	It would be fun for me if I were to choose environmentally friendly goods in the upcoming two months.
ATT-P	It would be interesting for me if I were to choose environmentally friendly goods in the upcoming two months.
PBC-CA	It would be easy for me to choose environmentally friendly goods in the upcoming two months.
PBC-CO	It is completely up to me whether I will choose environmentally friendly goods in the upcoming two months.
SN	People who are important to me, whom I like and respect, would approve of me choosing environmentally friendly goods in the upcoming two months.
MC	It is important to me what people who are important to me, whom I like and respect, think about me choosing environmentally friendly goods in the upcoming two months.
IN	In the upcoming two months I intend to choose environmentally friendly goods, I want to do it and I truly know that I will.
BE	In the past two months I always chose environmentally friendly goods in the upcoming two months.
	Conserving electricity
ATT-S	It would be meaningful if I were to not leave electrical appliances on when not in use in the upcoming two months.
ATT-S	It would be beneficial if I were to not leave electrical appliances on when not in use in the upcoming two months.
ATT-P	It would be fun for me if I were to not leave electrical appliances on when not in use in the upcoming two months.
ATT-P	It would be interesting for me if I were to not leave electrical appliances on when not in use in the upcoming two months.
PBC-CA	It would be easy for me to not leave electrical appliances on when not in use in the upcoming two months.
PBC-CO	It is completely up to me whether I will not leave electrical appliances on when not in use in the upcoming two months.
SN	People who are important to me, whom I like and respect, would approve of me not leaving electrical appliances on when not in use in the upcoming two months
MC	It is important to me what people who are important to me, whom I like and respect, think about me not leaving electrical appliances on when not in use in the upcoming two months.
IN	In the upcoming two months I intend not to leave electrical appliances on when not in use, I want to do it and I truly know that I will.
BE	In the past two months I never left electrical appliances on when not in use.

Table A1. *Cont.*

Variable	Item
	Recycling
ATT-S	It would be meaningful if I were to recycle in the upcoming two months.
ATT-S	It would be beneficial if I were to recycle in the upcoming two months.
ATT-P	It would be fun for me if I were to recycle in the upcoming two months.
ATT-P	It would be interesting for me if I were to recycle in the upcoming two months.
PBC-CA	It would be easy for me to recycle in the upcoming two months.
PBC-CO	It is completely up to me whether I will recycle in the upcoming two months.
SN	People who are important to me, whom I like and respect, would approve of me recycling in the upcoming two months.
MC	It is important to me what people who are important to me, whom I like and respect, think about me recycling in the upcoming two months.
IN	In the upcoming two months I intend to recycle, I want to do it and I truly know that I will.
BE	In the past two months I always recycled.
	Use of sustainable transportation
ATT-S	It would be meaningful if I were to choose the most environmentally friendly transportation option in the upcoming two months.
ATT-S	It would be beneficial if I were to choose the most environmentally friendly transportation option in the upcoming two months.
ATT-P	It would be fun for me if I were to choose the most environmentally friendly transportation option in the upcoming two months.
ATT-P	It would be interesting for me if I were to choose the most environmentally friendly transportation option in the upcoming two months.
PBC-CA	It would be easy for me to choose the most environmentally friendly transportation option in the upcoming two months.
PBC-CO	It is completely up to me whether I will choose the most environmentally friendly transportation option in the upcoming two months.
SN	People who are important to me, whom I like and respect, would approve of me choosing the most environmentally friendly transportation option in the upcoming two months.
MC	It is important to me what people who are important to me, whom I like and respect, think about me choosing the most environmentally friendly transportation option in the upcoming two months.
IN	In the upcoming two months I intend to choose the most environmentally friendly transportation option, I want to do it and I truly know that I will.
BE	In the past two months I always chose the most environmentally friendly transportation option.
	Conserving water
ATT-S	It would be meaningful if I were to not leave the water running when not needed in the upcoming two months.
ATT-S	It would be beneficial if I were to not leave the water running when not needed in the upcoming two months.
ATT-P	It would be fun for me if I were to not leave the water running when not needed in the upcoming two months.
ATT-P	It would be interesting for me if I were to not leave the water running when not needed in the upcoming two months.
PBC-CA	It would be easy for me not to leave the water running when not needed in the upcoming two months.
PBC-CO	It is completely up to me whether I will not leave the water running when not needed in the upcoming two months.
SN	People who are important to me, whom I like and respect, would approve of me not leaving the water running when not needed in the upcoming two months.
MC	It is important to me what people who are important to me, whom I like and respect, think about me not leaving the water running when not needed in the upcoming two months.
IN	In the upcoming two months I intend not to leave the water running when not needed, I want to do it and I truly know that I will.
BE	In the past two months I never left the water running when not needed.

Appendix B

Table A2. Descriptive statistics of all unstandardized variables used in the analysis.

Variable	Full Sample (N = 863)				Negative (N = 267)				Conservative (N = 198)				Outgoing (N = 202)				Positive (N = 196)			
	M	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**
Extraversion	3.35	0.59	−0.17	0.01	2.96	0.41	−0.84	0.86	3.07	0.53	−0.28	0.03	3.81	0.39	0.17	0.08	3.69	0.48	−0.17	0.05
Agreeableness	3.41	0.53	−0.21	0.14	3.22	0.48	−0.70	0.44	3.24	0.41	0.26	0.81	3.36	0.51	−0.35	−0.03	3.90	0.38	−0.18	0.34
Conscientiousness	3.38	0.57	−0.01	−0.16	3.18	0.49	−0.40	0.05	3.00	0.41	0.05	0.88	3.43	0.47	−0.20	−0.12	3.99	0.37	0.44	−0.21
Neuroticism	3.02	0.65	0.01	−0.03	3.40	0.58	0.00	−0.31	3.00	0.57	0.14	0.33	2.92	0.62	−0.05	0.20	2.61	0.56	−0.07	0.00
Openness	3.48	0.65	−0.26	0.07	3.62	0.45	−0.18	0.73	2.78	0.46	−0.88	0.75	3.54	0.65	−0.04	−0.43	3.92	0.48	0.05	−0.40
Sustainable consumption																				
Self-oriented attitudes	3.21	0.87	−0.23	0.15	3.18	0.78	−0.33	0.44	2.95	0.82	−0.31	0.69	3.23	0.95	−0.12	−0.20	3.51	0.89	−0.46	0.14
Society-oriented attitudes	3.58	0.87	−0.43	0.19	3.66	0.82	−0.45	0.29	3.24	0.90	−0.43	0.32	3.54	0.88	−0.23	−0.33	3.84	0.81	−0.54	0.64
Perceived behavioral control	10.86	5.41	0.55	0.07	10.87	5.26	0.41	−0.14	8.86	4.73	0.91	1.61	11.20	5.68	0.66	0.15	12.52	5.36	0.28	−0.26
Subjective norm	11.41	5.71	0.44	−0.12	11.16	5.22	0.34	−0.12	9.68	5.39	0.68	0.55	11.54	5.85	0.45	−0.12	13.36	5.93	0.25	−0.42
Intention	2.97	1.03	−0.07	−0.29	2.86	1.00	−0.09	−0.28	2.80	0.96	−0.01	0.02	3.01	1.14	0.02	−0.63	3.24	0.98	−0.33	0.17
Self-reported behavior	2.80	1.08	0.12	−0.56	2.71	1.07	0.14	−0.59	2.69	0.99	0.24	−0.15	2.77	1.11	0.21	−0.57	3.09	1.09	−0.15	−0.59
Conserving electricity																				
Self-oriented attitudes	3.26	0.89	−0.14	0.04	3.23	0.81	−0.15	0.34	3.03	0.87	−0.07	0.36	3.28	0.97	−0.10	−0.41	3.51	0.87	−0.33	0.28
Society-oriented attitudes	3.66	0.89	−0.61	0.49	3.71	0.86	−0.59	0.39	3.32	0.90	−0.54	0.44	3.64	0.89	−0.57	0.41	3.94	0.82	−0.81	1.35
Perceived behavioral control	13.01	6.07	0.33	−0.51	13.35	5.89	0.33	−0.44	10.53	5.36	0.60	0.15	12.94	6.24	0.43	−0.64	15.14	5.93	−0.01	−0.41
Subjective norm	12.40	6.02	0.39	−0.41	12.34	5.81	0.39	−0.20	10.11	5.44	0.62	0.21	13.03	6.39	0.38	−0.72	14.16	5.76	0.18	−0.47
Intention	3.40	1.04	−0.24	−0.35	3.42	1.01	−0.31	−0.22	3.03	1.03	0.05	−0.21	3.39	1.05	−0.10	−0.44	3.74	0.95	−0.60	0.24
Self-reported behavior	3.17	1.09	−0.07	−0.65	3.09	1.14	−0.05	−0.73	2.99	0.99	0.23	−0.22	3.11	1.12	−0.15	−0.68	3.52	1.03	−0.26	−0.64
Recycling																				
Self-oriented attitudes	3.22	0.92	−0.27	−0.08	3.18	0.86	−0.32	−0.04	2.97	0.84	−0.27	0.29	3.21	1.05	−0.19	−0.50	3.52	0.87	−0.49	0.47
Society-oriented attitudes	3.69	0.89	−0.51	0.11	3.81	0.81	−0.57	0.31	3.34	0.88	−0.22	0.07	3.66	0.94	−0.44	−0.08	3.93	0.85	−0.87	1.07
Perceived behavioral control	11.68	5.94	0.47	−0.25	11.62	5.69	0.39	−0.17	9.95	5.32	0.66	0.44	11.79	6.32	0.55	−0.37	13.39	5.99	0.33	−0.59
Subjective norm	11.78	5.92	0.49	−0.19	11.58	5.57	0.40	−0.14	9.91	5.43	0.77	0.48	12.01	6.32	0.54	−0.25	13.67	5.88	0.28	−0.42
Intention	3.10	1.12	−0.172	−0.56	3.13	1.11	−0.25	−0.47	2.83	1.09	0.04	−0.50	3.03	1.15	−0.14	−0.67	3.41	1.06	−0.31	−0.31
Self-reported behavior	2.96	1.23	0.033	−0.96	2.92	1.23	−0.02	−1.01	2.77	1.18	0.22	−0.69	2.96	1.27	0.03	−1.02	3.20	1.22	−0.09	−1.01
Use of sustainable transportation																				
Self-oriented attitudes	3.23	0.90	−0.30	0.10	3.21	0.86	−0.32	0.19	3.01	0.88	−0.39	0.35	3.23	0.95	−0.06	−0.16	3.50	0.86	−0.55	0.38
Society-oriented attitudes	3.62	0.88	−0.49	0.34	3.72	0.82	−0.34	0.13	3.28	0.92	−0.49	0.33	3.56	0.90	−0.44	0.24	3.88	0.77	−0.44	0.07
Perceived behavioral control	10.79	5.64	0.65	0.16	10.35	5.56	0.59	0.04	9.43	4.92	0.81	1.13	10.92	6.01	0.72	0.13	12.64	5.59	0.51	−0.20
Subjective norm	11.12	5.82	0.63	0.01	10.96	5.71	0.78	0.22	9.44	5.11	0.66	0.64	11.53	6.00	0.61	−0.07	12.59	6.04	0.34	−0.46
Intention	3.01	1.10	−0.12	−0.47	3.01	1.08	−0.16	−0.48	2.76	1.03	0.08	−0.25	2.96	1.14	−0.03	−0.54	3.32	1.06	−0.44	−0.05
Self-reported behavior	2.95	1.07	0.01	−0.54	2.96	1.08	0.00	−0.57	2.83	1.01	0.04	−0.23	2.94	1.09	0.13	−0.53	3.08	1.09	−0.19	−0.65

Table A2. *Cont.*

Variable	Full Sample (N = 863)				Negative (N = 267)				Conservative (N = 198)				Outgoing (N = 202)				Positive (N = 196)			
	M	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**	**M**	**SD**	**S**	**K**
Conserving water																				
Self-oriented attitudes	3.21	0.90	−0.21	0.10	3.16	0.87	−0.35	0.37	3.01	0.88	−0.16	0.12	3.26	0.88	−0.10	0.10	3.44	0.94	−0.32	−0.03
Society-oriented attitudes	3.68	0.89	−0.45	0.07	3.75	0.86	−0.42	−0.06	3.33	0.90	−0.49	0.36	3.64	0.89	−0.32	−0.30	3.99	0.79	−0.50	0.18
Perceived behavioral control	12.88	6.19	0.35	−0.53	13.34	5.80	0.32	−0.34	10.56	5.36	0.71	0.56	12.63	6.65	0.34	−0.82	14.87	6.23	0.07	−0.66
Subjective norm	12.41	5.97	0.38	−0.36	11.94	5.65	0.44	−0.16	10.92	5.68	0.61	0.24	13.01	6.42	0.26	−0.70	13.94	5.83	0.20	−0.36
Intention	3.38	1.10	−0.30	−0.46	3.37	1.08	−0.38	−0.26	3.04	1.05	0.01	−0.24	3.31	1.13	−0.24	−0.59	3.81	1.02	−0.69	0.08
Self-reported behavior	3.33	1.13	−0.28	−0.62	3.33	1.12	−0.45	−0.43	3.04	1.09	−0.05	−0.51	3.28	1.18	−0.25	−0.77	3.67	1.05	−0.29	−0.79

Note. S—Skewness; K—Kurtosis.

Appendix C

Table A3. ANOVA results of behavior-specific variables among clusters.

Compared Variables	*F*	*p*	ω^2
Sustainable consumption			
Self-oriented attitudes	13.92	0.00	0.04
Society-oriented attitudes	17.51	0.00	0.05
Perceived behavioral control	16.27	0.00	0.05
Subjective norm	14.53	0.00	0.04
Intent	7.44	0.00	0.02
Self-reported behavior	6.12	0.00	0.02
Conserving electricity			
Self-oriented attitudes	10.02	0.00	0.03
Society-oriented attitudes	17.11	0.00	0.05
Perceived behavioral control	20.78	0.00	0.06
Subjective norm	16.82	0.00	0.05
Intent	16.24	0.00	0.05
Self-reported behavior	9.43	0.00	0.03
Recycling			
Self-oriented attitudes	12.35	0.00	0.04
Society-oriented attitudes	17.53	0.00	0.05
Perceived behavioral control	11.46	0.00	0.04
Subjective norm	14.01	0.00	0.04
Intent	9.59	0.00	0.03
Self-reported behavior	4.22	0.01	0.01
Use of sustainable transportation			
Self-oriented attitudes	10.30	0.00	0.03
Society-oriented attitudes	17.98	0.00	0.06
Perceived behavioral control	11.83	0.00	0.04
Subjective norm	10.43	0.00	0.03
Intent	9.20	0.00	0.03
Self-reported behavior	1.80	0.15	0.00
Conserving water			
Self-oriented attitudes	8.22	0.00	0.02
Society-oriented attitudes	20.01	0.00	0.06
Perceived behavioral control	17.66	0.00	0.05
Subjective norm	9.93	0.00	0.03
Intent	17.69	0.00	0.05
Self-reported behavior	10.77	0.00	0.03

Notes. df = (3, 859).

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